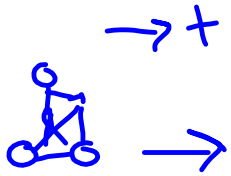
Acceleration Practice

1. $\bar{a} = \dfrac{\bar{v}_f - \bar{v}_i}{t_f - t_i}$ ($\bar{v}_i \to 0$, $t_i \to 0$)



$a = +7\ m/s^2$

$\bar{v}_i = 0\ m/s \quad \bar{v}_f = +18\ m/s$

$t_i = 0\ s \quad t_f = ?$

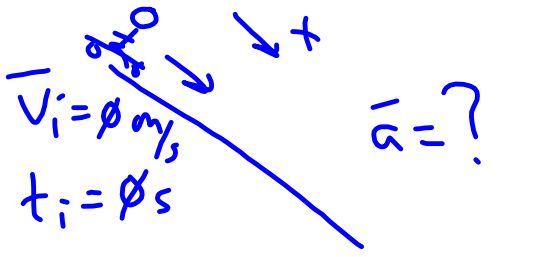
$$a = \frac{v_f}{t_f}$$

$$t_f = \frac{v_f}{a}$$

$$= \frac{+18\ m/s}{+7\ m/s^2}$$

$$= 2.57\ s$$

2. $\bar{a} = \dfrac{\bar{v}_f - \bar{v}_i}{t_f - t_i}$



$\bar{v}_i = 0\ m/s$

$t_i = 0\ s$

$\bar{a} = ?$

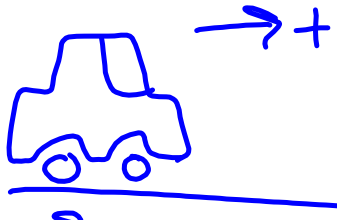
$\bar{v}_f = +7\ m/s$

$t_f = 3\ s$

$$= \frac{+7\ m/s}{3\ s}$$

$$= 2.33\ m/s^2$$

8. $\bar{a} = \dfrac{\bar{v}_f - \bar{v}_i}{t_f - t_i}$



$\bar{v}_i = ?$ $\bar{v}_f = 0\ m/s$

$t_i = 0\ s$ $t_f = 7.5\ s$

$\leftarrow \bar{a} = -4.0\ m/s^2$

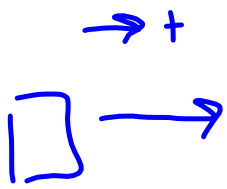
$\bar{a} = \dfrac{-\bar{v}_i}{t_f}$

$\bar{v}_i = -\bar{a} t_f$

$= -(-4.0\ m/s^2)(7.5\ s)$

$= 30\ m/s$

A spaceship traveling at 1000 m/s comes to a complete stop by accelerating at -125 m/s/s. How long did it take the spaceship to come to a complete stop?



$\bar{a} = -125\ m/s^2$

$\bar{v}_i = +1000\ m/s$ $\quad \bar{v}_f = 0\ m/s$

$t_i = 0\ s$ $\quad t_f = ?$

$$\bar{a} = \frac{\bar{v}_f - \bar{v}_i}{t_f - t_i}$$

$$\bar{a} = \frac{-\bar{v}_i}{t_f}$$

$$t_f = \frac{-\bar{v}_i}{\bar{a}}$$

$$= \frac{-1000\ m/s}{-125\ m/s^2}$$

$$= 8\ s$$